# Navigating Green Building Certification, Sustainability, and Public Perception: Identifying and Understanding Barriers to Widespread Adoption of Green Building Practices in Smaller Municipalities.

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**Abstract**

Despite the growing prevalence of green building (GB) practices in larger urban centers, as highlighted by existing research, smaller municipalities face significant challenges in adopting these practices due to economic, social, and regulatory barriers. Using a mixed-methods approach, this study integrates a systematic literature review (SLR) with a 33-participant survey and nine follow-up interviews to gather qualitative and quantitative insights into the barriers and motivators affecting GB adoption in smaller municipalities. The findings identify that the main barriers are actual and perceived high costs, limited public awareness of certification programs, and inadequate municipal support. Key motivators for adopting GB practices were financial incentives and targeted public education to promote increased GB adoption. This study highlights the importance of adapting policy and community engagement approaches to bridge the knowledge gap, align stakeholder interests with sustainable objectives, and foster enhanced community sustainability, seeking to motivate a more widespread integration and acceptance of green building practices at the municipal level.

**Keywords:** green building, sustainability, public perception, barriers, incentives, social equity

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## Introduction

The concept of green buildings in the US has evolved significantly over the past three decades with the establishment of the American Institute of Architects (AIA) Committee on the Environment (Melton, 2021), marking a noteworthy shift in architectural and environmental priorities (Figure 1). The initiative paved the way for various certification programs and standards to enhance sustainability across the built environment. The development of these programs has led to a significant increase in green building (GB) practices for promoting sustainability within urban development. Standards such as Leadership in Energy and Environmental Design (LEED), Well, and Energy Star have become benchmarks for designing, constructing, and operating high-performance green buildings to emphasize energy efficiency, resource conservation, and building occupant health.

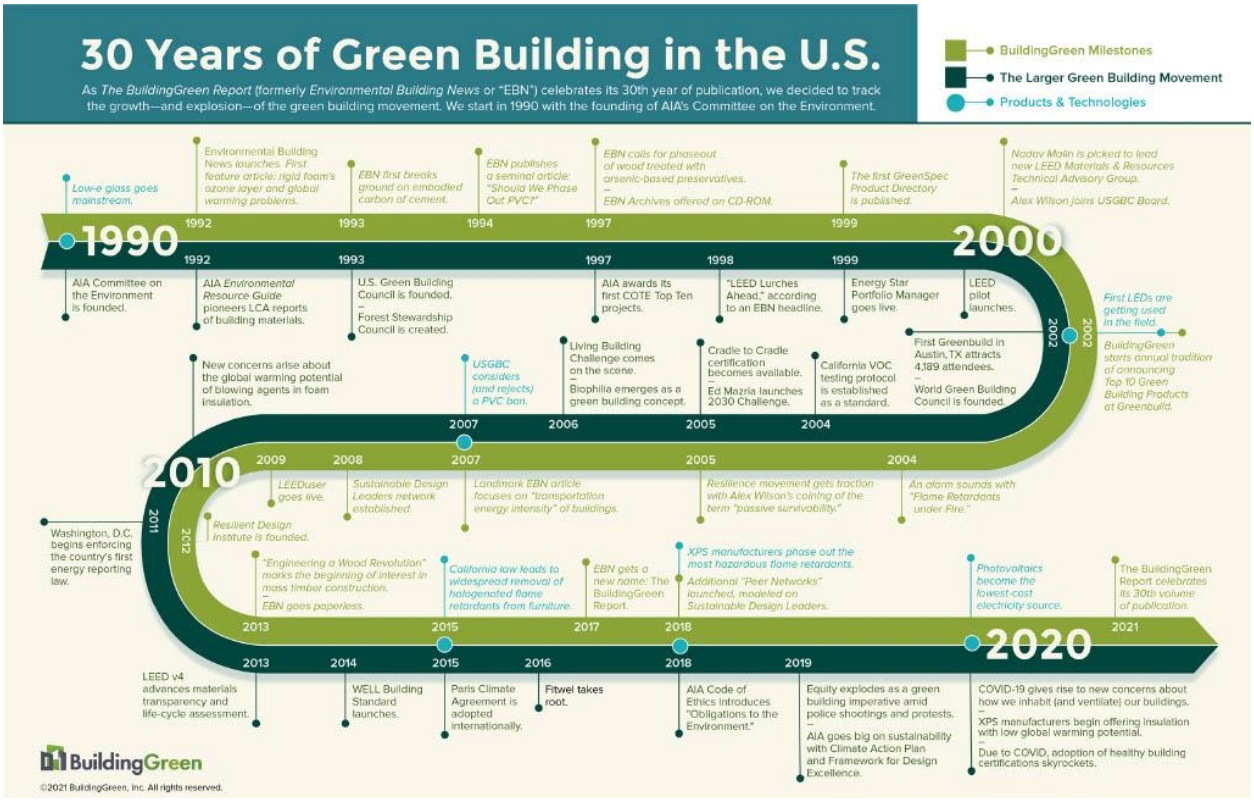


Figure 1. Growth of the Green Building Movement in the US. Image credit: Building Green

Exemplified by these and other standards, GB practices have become more prevalent in larger city centers, notably in commercial and institutional buildings that contribute significantly to sustainability and energy efficiency (Vierra, 2023). However, in smaller municipalities, the integration of GB practices falls significantly behind (McGrath, 2018). This discrepancy highlights a gap in adopting GB practices, underscoring distinct challenges and barriers faced by smaller communities that hinder their progress.

This study aims to identify the challenges surrounding the slow adoption of GB practices in smaller communities and investigate factors that inhibit their widespread adoption, including perceived higher costs, limited public awareness, and lack of robust municipal support, which have been identified as deterrents (Hu, 2022, Standards Issue 001/US Public Research Report 2020). Through a mixed-methods approach, this research explores how these barriers can be mitigated and identifies strategies to promote the adoption of GB certifications.

By examining how smaller municipalities can overcome these challenges, this study aligns with broader sustainability goals, advocating for change in both policy and public perception to support sustainable urban environments. Bridging the existing gap in GB adoption between larger cities and smaller municipalities will foster more resilient and sustainable urban landscapes (McGrath, 2018, US Census Bureau Public Information Office, 2016)

**Statement of Sustainability and Problem Statement**

This study is driven by a commitment to fostering resilient and sustainable communities across all urban scales. It is particularly fundamental as GB accreditation programs become increasingly prevalent in densely populated US cities. This highlights the gap in GB adoption compared to smaller municipalities and the potential for these practices to significantly enhance sustainability through reduced energy consumption, lower carbon emissions, and improved living conditions. This study aims to understand why smaller municipalities lag in adopting GB accreditation by examining current applications of GB standards through the lens of economic, social, and regulatory barriers that hinder widespread adoption at the municipal level. The overarching goal is to bridge the identified gaps using effective strategies to overcome barriers and promote an inclusive approach to sustainability that benefits communities of all sizes.

## Methodology

This research utilizes a mixed-methods approach to explore GB accreditation in smaller municipalities through integrated surveys, in-depth interviews, a systematic literature review (SLR), and thematic analysis to obtain qualitative and quantitative data about the lag in widespread adoption of GB practices in smaller municipalities.

### Research Question

What factors hinder the adoption of green building practices in smaller municipalities, and what strategies can effectively bridge this gap to elevate sustainable building practices at the local level?

### Methods

#### *Surveys*

A qualitative, 10-question, 15-person pilot study conducted through social media (Facebook) explored personal beliefs, perceptions, motivations, and experiences regarding GB accreditation in smaller municipalities that helped inform the main study's research design.

The primary study survey combined qualitative and quantitative questions using convenience sampling. It collected data from 33 participants, including small business owners, homeowners, and renters across four small Washington State municipalities, to assess engagement and visibility of GB initiatives and perceived levels of support from community leaders and the public.

#### *In-Depth Interviews*

Nine participants agreed to discuss their individual experiences and the influence of local policies on GB practices through in-depth interviews. The interview questions The SLR

supported these findings by identifying gaps in existing research and suggesting areas for actionable strategies to improve the widespread adoption of GB practices in the community.

***Systematic Literature Review***

Literature was sourced using academic databases, including Google Scholar, Elsevier, and the University of Arizona Library Databases, initially searching for studies on GB practices focused on themes of cost, public perceptions, and sustainability based on the earlier pilot study. Extending the academic themes to include socio-environmental and social equity and regional influences was a result of further developing the research goal to answer questions raised in the pilot study, specifically as it touched upon issues of social equity about access to green buildings and their benefits, regional influences, such as local climate and cultural attitudes toward sustainability, and socio-environmental motivators, such as improved air quality, associated with GB practices.

This expanded review was essential for understanding the scope and depth of GB practices, particularly in smaller municipalities. 11 sources from the pilot study are combined with 8 additional sources for 19 used in this study, including journal articles, books, and industry websites. It combines quantitative and qualitative data to collectively identify and contextualize barriers, drivers, supports, and solutions related to identified themes in GB practices.

The SLR also found statistics used to identify key findings and recommendations, data limitations, and further research areas. The quantitative statistics used across the sources include correlations, as found in Altomonte et al. cost comparisons (Hu, 2022), and other statistical analyses that comprise the empirical evidence related to the perceptions, motivations, and barriers to adopting more Green Buildings across the municipal landscape.

***Justification***

The mixed-methods approach captures qualitative and quantitative insights into GB practices in smaller municipalities; by integrating the surveys with in-depth interviews and SLR, this study ensures a comprehensive analysis and framework for public perceptions, motivations, and barriers to highlight the unique challenges smaller communities face. It facilitates the development of targeted, actionable strategies to enhance sustainable building practices.

# Results

## Pilot Study Analysis

The pilot study findings revealed a general awareness of the importance of sustainable building practices yet highlighted a gap in actual participation. Key findings indicate that while most participants recognize the value of GB accreditation, their engagement was primarily hindered by cost and lack of perception and awareness of GB programs. This analysis underscores the complexities of adopting GB practices in smaller communities and highlights the areas where targeted interventions are crucial for enhancing sustainability efforts.

Responses regarding perceived support for GB practices from local architects and developers were mixed, with many participants feeling neutral. Economic incentives emerged as the primary motivation for homeowners considering GB practices. Additionally, there is strong consensus on the necessity of public support for promoting sustainable building practices, yet significant barriers, such as stakeholder resistance and limited awareness, persist.

## Survey Analysis

For this study, the researcher directly contacted 50 friends and acquaintances to participate in the survey, with a response rate of 33 participants, or 66%. Participants responded to 23 questions, some of which had sub-questions dependent on previous responses. The sub-questions were designed to provide insight and clarity into GB certification systems awareness (which types are known about) and participation levels and specify any unique drivers or barriers for participants behind their participation levels in the context of their home and business location selections.

Not all of the questions were used in this analysis as they did not contribute to this study meaningfully to answer the main research question. Four questions related to geographic and demographic data were omitted to focus on the most relevant questions for this study, mitigating losing focus on the primary goal of the research; a total of 18 questions were ultimately used for the primary survey analysis, who were then categorized for further analysis.

***Categorization of Participants***

Participants were categorized into homeowners, renters, and business owners to analyze if and how living situations influence perceptions and engagement with GB practices. This helped to identify any distinct interests and levels of control over property modification in further questions. The participants were divided into 28 homeowners, 5 renters, and 10 business owners; 4 business owners owned locations that were not in their homes, and 2 business owners were also renters.

***Awareness and Participation in Green Building Programs***

Participants were asked if they were aware of GB programs within their municipality and had ever participated in or applied for any GB accreditation programs. Fewer than half of all participants replied that they were aware; participation rates are also significantly lower (Figure 2). LEED, Well, and Energy Star were the only recognized certification programs identified by those who participated. Other participatory actions identified but were not specific to any common or branded certification system include green healthcare initiatives, adding solar panels to a rooftop, and converting to low-flow faucets and LED lighting in the home.

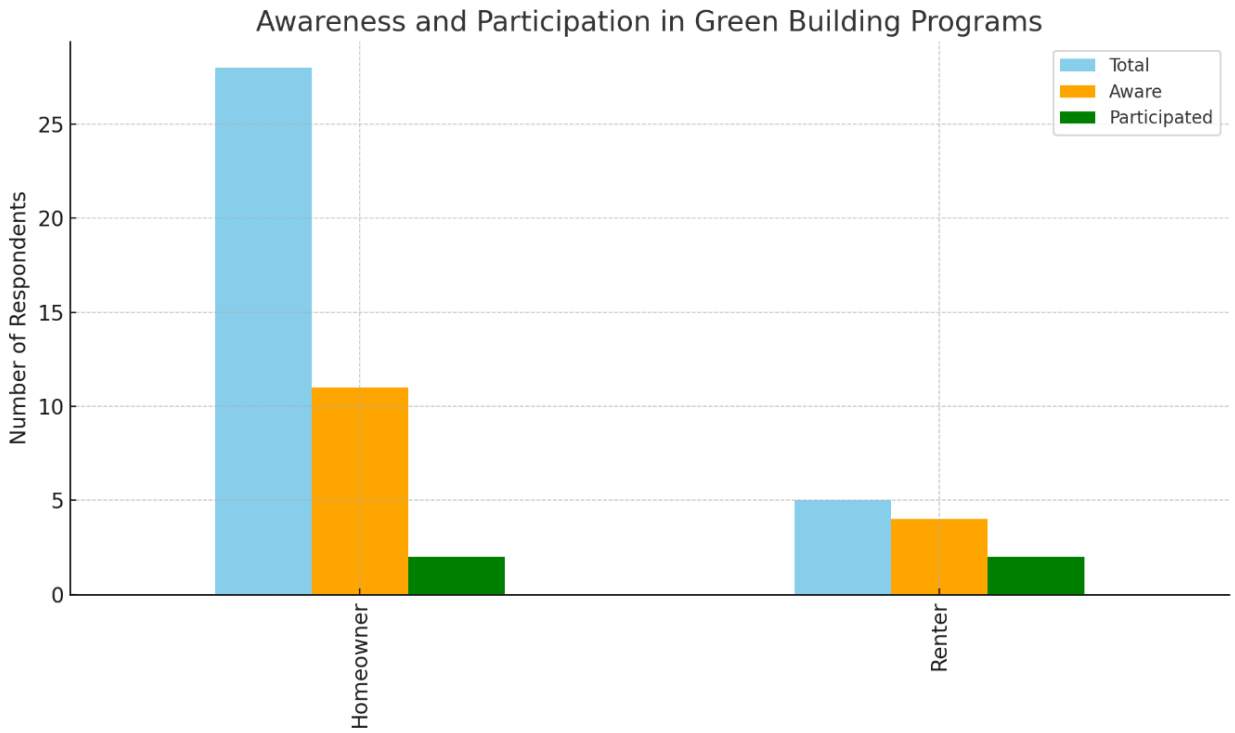


Figure 2. Participants' awareness and participation in green building programs among homeowners and renters. The x-axis represents homeowners on the left and renters on the right and whether they have participated in green building programs. The y-axis shows the number of respondents for each category.

***Perceived Importance of Green Accreditation***

When asked to select a response between not important at all and very important, most Participants believe that GB accreditation is very important for promoting sustainable building practices. 19 Participants said it is very important, 9 said it is somewhat important, and 3 were neutral on the value.

***Perceived Support by Stakeholder Groups***

Participants were asked to rate the support for green building accreditation in their municipality or region from Architects/Designers, City Officials, Developers, and The General Public in (their) Community. The responses varied, with neutral dominating in each group. The level of overall support is not very high, and, not significantly, the Architects/Designers group

rates marginally higher than the General Public. In contrast, City Officials and Developers rate only slightly lower (Figure 3).


Figure 3. Participants' perceptions of the level of support for green building accreditation programs among four groups: Architects/Designers, City officials, Developers, and the General Public. The x-axis represents the groups and the level-type of support selected: very supportive, supportive, somewhat supportive, and neutral. The y-axis shows the number of participants who selected the support rating for each group.

### *Green Building Influences*

Six homeowners report that GB factors influenced their decisions when purchasing their homes. Glazing, building orientation, insulation, building envelope, construction materials, solar panels, the landscape (orchards and gardens), energy costs/savings, and low carbon impact were the reasons given. Only 1 renter reported factors influencing their home-selection decision, which was given as “shifting to xeriscaping.” One business owner said they bought

their business property to adaptively reuse the building using sustainable practices and reduce their carbon footprint.

### *Motivations for Accreditation*

To understand the hierarchy of motivations behind pursuing green building accreditations for their home or business property, participants were asked to rank in order of priority, Personal Values, Environmental Impact, Aesthetic Appeal, Financial Incentives (tax breaks, subsidies, etc.), Regulatory Compliance, or Other where they could further specify something distinct beyond personal values. The ranking order was 1-6, with 1 being the most important and 6 being the least important. Personal Values had the highest overall rank, followed by Environmental Impact, Financial Incentives, and Aesthetic Appeal. Regulatory compliance ranked extremely low. (Figure 4).

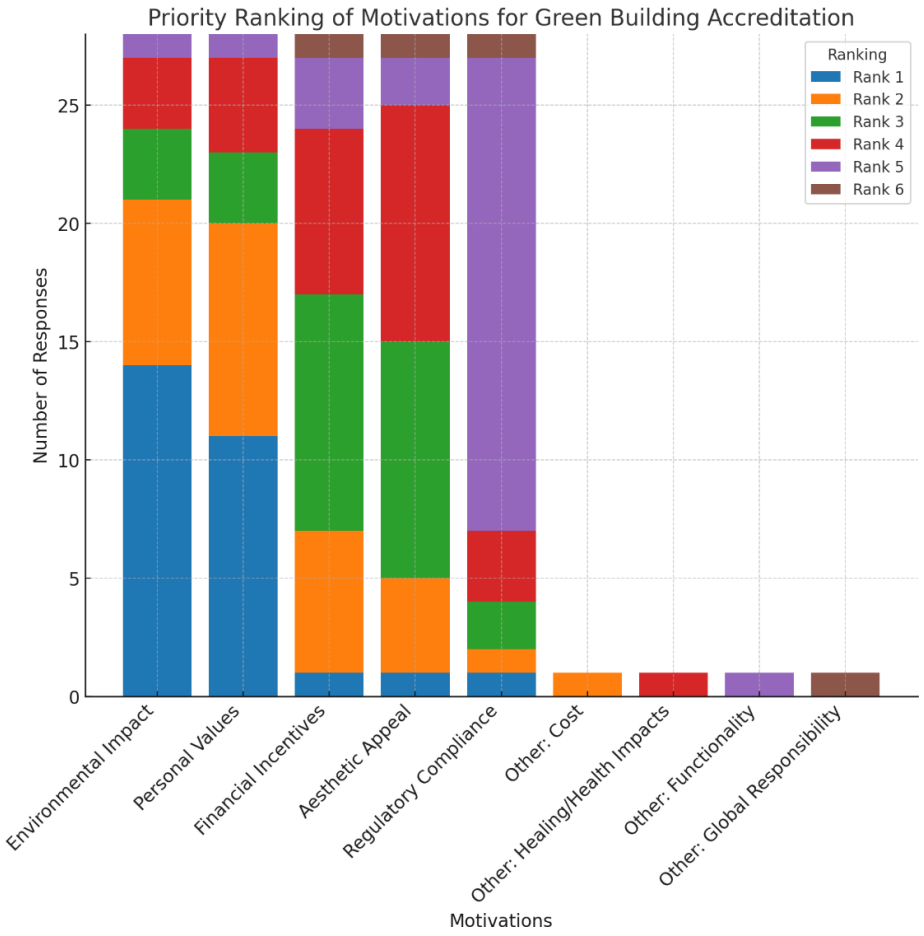


Figure 4. Participants' priority ranking of motivations for green building accreditation. The x-axis shows the motivation; the y-axis shows the number of responses for each ranking level of that motivation.

***Reasons for Non-Participation***

To identify barriers to GB participation, participants who had not personally participated in GB accreditation programs were asked to select from a list of responses that included Financial Constraints, Lack of Awareness About the Programs, Limited Perceived Benefits, or Other where they could further specify something distinct behind their reasons.

Lack of Awareness About the Programs was the most significant response, at 56%, followed by Financial Constraints at 24% and the remaining selecting at 4%. Other reasons include the

home's older age, the municipality's refusal to allow homeowner participation (they require certified professionals to do any related work), and the perception that simply being a renter precludes participation (Figure 5).

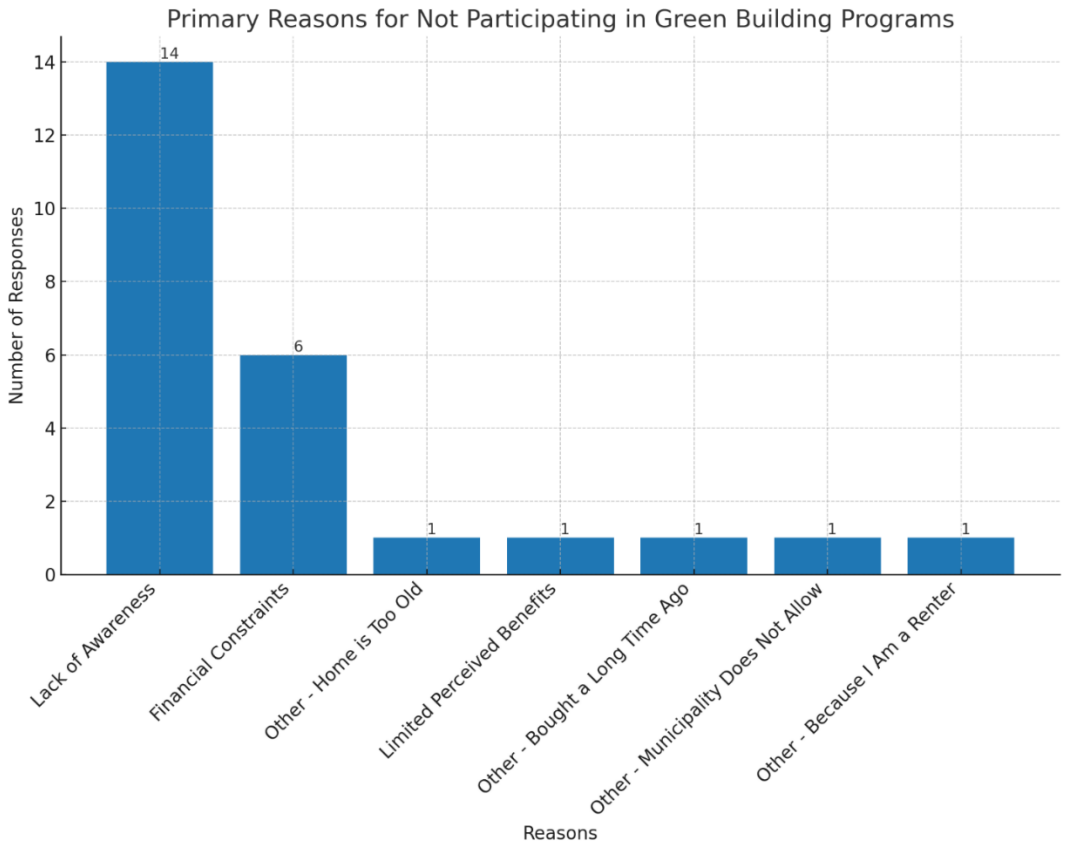


Figure 5. Participants' primary reasons for not participating in Green Building programs. The x-axis shows the reasons, and the y-axis shows the number of participant responses.

***Perception of Green Buildings' Role in Social Equity***

To assess how perceptions of GB contribute to social equity, participants were asked to rate the contribution from Not at all contributing to Absolutely contributing. The majority of participants, 14, selected neutral, with slightly fewer participants seeing some form of contribution overall. Seven participants selected Contributing, four selected Somewhat contributing but not significant, and one selected absolutely contributing (Figure 6).

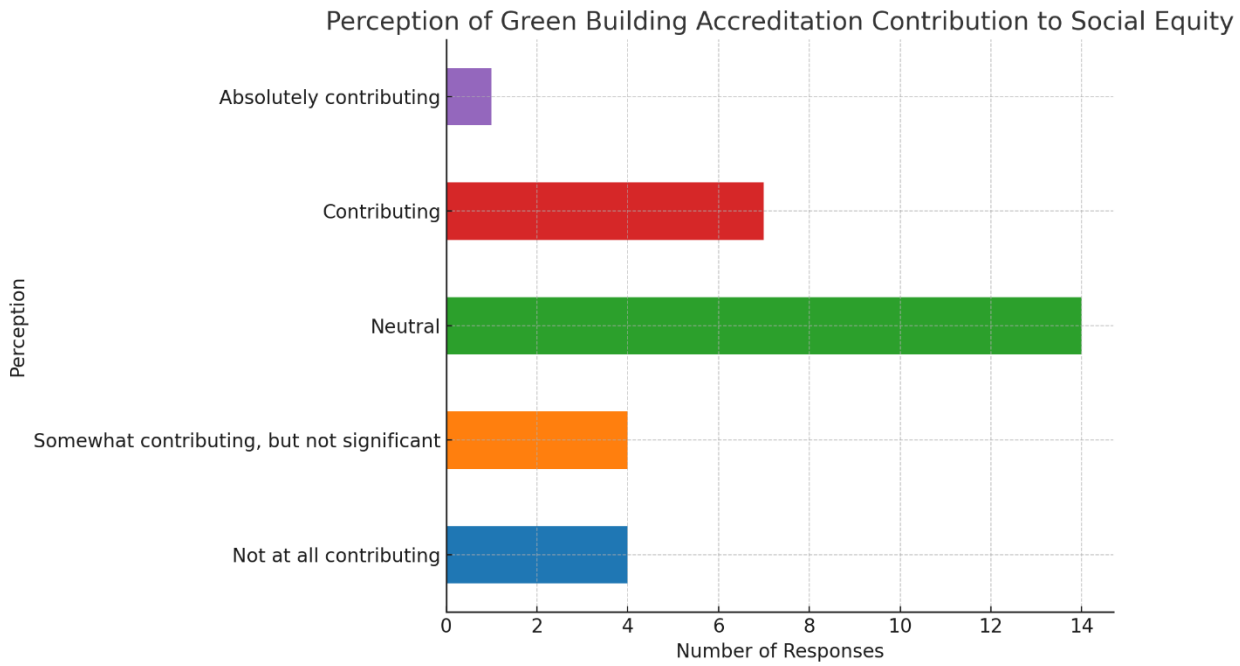


Figure 6. Participants' perceptions of Green Building accreditation's contribution to Social Equity. The x-axis shows the number of responses, and the y-axis shows the perception.

***Observation of Disparities***

Participants were asked if they had observed disparities in accessibility to GB accreditation across different demographic groups in their communities to highlight issues of inclusivity and accessibility in GB programs. 11 participants responded yes; they had seen disparities.

**In-Depth Interviews**

Survey participants were also asked if they would be willing to participate in a follow-up interview to discuss their responses in more detail. 16 replied yes and provided contact details as requested; however, only 9 responded when the researcher contacted them to set up interview times. While all participants remained anonymous unless they chose to have an interview, they were identified in the research by their position in the survey response order.

The interviews varied in length and breadth of response and were conducted in various locations, either in the interviewee's home, at a coffee house, or via Zoom. Each interviewee agreed to be recorded either by audio or video. In 8 out of 9 cases, transcripts were generated automatically for each interview and reviewed by the researcher to ensure accuracy.

The interview questions were designed to provide detailed insights into participants' survey responses. They allowed participants to elaborate on their understandings, experiences, and perspectives to generate a more comprehensive view of factors influencing the adoption of GB practices within their community.

***Awareness and Experience with Green Building Accreditation Programs***

Interviewees discussed their familiarity with GBA programs like LEED and the extent of their understanding or direct experiences with this type of accreditation. This helped determine the extent to which they truly understood the functions of GB rating systems beyond basic recognition. It was mixed with 3 participants clearly understanding through professional experiences with LEED and WELL. "…important because it encourages conservation of resources through energy conservation and quality using quality materials. It leads to longevity of structure, occupant, comfort, and good design and site layout and size, and good glazing leads to a longer-lasting, better environment for occupants" – Participant #1. The remaining participants were less certain: "I thought I was aware, but I'm not. I could not name a specific one." – Participant #25. The results of the interviews point to knowledge gaps and misconceptions about what GB programs entail and require.

***Motivations for Green Building Accreditation***

Interviewees are motivated both intrinsically and extrinsically to pursue GB (even if just in theory) primarily by environmental concerns. “Changing regular climate patterns…impacts air quality.” Air quality is also tied to building materials in urban design decisions, “Fossil fuels are pollution from extraction to manufacture.” - Interviewee #3. Occupant health was also a noted motivator, “…living in the Pacific Northwest (a wet climate) and being in healthcare…we’re so moist and exposed to things like black mold…and the impact of it.” – Participant #4. Economic benefits are also figured in the context of energy savings and potential property value increases for homeowners. One interviewee explained their economic rationale as “…if they can be shown that by adding certain features will save them a lot of money…and make them more comfortable without implementing what I think a lot of people think are extreme levels of green building…it makes sense to them, and therefore then they’re more open to the idea of doing it.” – Participant #1.

***Community Support for Green Building Accreditation***

Interviewees generally feel community support for GB accreditation exists, particularly among professional groups such as architects, designers, and city officials. One participant felt that part of the role of contractors was to educate homeowners about green initiatives: “I think it’s important to hold our contractors…in line with that…because a lot of homeowners don’t know a lot of that stuff, so we kind of hold that on our contractors to be telling us.” - Interviewee #4. Interviewee #29, however, emphasized that collective action towards community support would be necessary for the US, in general, to avoid being “the country that people make fun of because we're inefficient and wasting a lot of energy.” The statement was, in part, a reference to how Denmark is using regulatory measures to enforce energy efficiency

across several sectors, including the buildings, through a “competitive subsidy scheme” (*Denmark's Integrated National Energy and Climate Plan* 2019) and comparing it to the US as a way to enforce energy efficiency. The interviewee is interested in seeing how this plays out over time and how enforcement might work in smaller communities across the US.

***Barriers to Green Building Participation***

Cost was the most highlighted as a potential barrier by interviewees with little to no awareness of certification systems: "Cost is going to be a biggie... old habits die hard” – Participant #4. “…I think for a lot of people, it all comes back to cost…”- Participant #7. One barrier identified and supported in the SLR is the lack of coordinated standards. Interviewee #29 commented, “The big one for me was that when you have a coordinated project…the standards of each of those companies are not in line with lead…they might have a different interpretation based on their experience, and I found myself getting stuck in positions…why am I trying to, you know, reduce the energy of light bulbs when they just installed an inefficient boiler on the other side of the building here, and it was because that vendor didn't have to go through this process, it was kind of like a checkbox (where)this is the only option - you get this inefficient boiler, because what we're used to doing out here, and it meets all these other regulations, and so they would kind of just skirt that.”

City prioritization is also seen as a barrier. Interviewee #3 felt that while city officials may be supportive, they still have to prioritize other pressing issues, like crime and homelessness, which means GB accreditation and sustainability are not seen as immediate priorities.

***Impact on Social Equity***

For interviewees with no experience or limited awareness of GB rating systems, social equity in relation to green buildings was challenging to grasp. Some initially struggled to connect green buildings with social equity, so I shared the LEED Social Impact Checklist to help further their understanding (*LEED Social Equity Checklist (integrative process)* 2019).

**Systematic Literature Review**

The SLR examines 19 documents over a broad spectrum of issues related to GB practices and identifies six key themes critical to understanding the slow adoption of GB practices in smaller municipalities. Structuring the SLR thematically allowed for a comparison of thematic insights with the primary survey data collected.

Some of the documents, as shown below, cover multiple themes, which provide the framework for analysis in this study: the costs of Green Building, Public Perception and Awareness, Socio-Environmental Benefits, Sustainability and Social Equity, Cultural and Regional Considerations, and Strategies for Overcoming Barriers.

***Costs of Green Building***

Four of the articles scrutinized, to varying degrees, the economic impact and feasibility of sustainable design. Hu (2023) focuses on the financial aspects of sustainable building construction costs (SBCC), highlighting the perception of sustainable building as an expensive choice and how GB rating systems might influence this perception. Chegut et al. (2109) analyzed additional costs incurred in green building, mainly due to higher design fees and longer construction times. It also looks at how these costs are offset by higher market values of GBs while emphasizing a balance between upfront costs and long-term economic benefits. Ahmad et al. (2019) explore the positive correlations between cost performance and economic

sustainability and various conditions that affect cost performance, such as project planning and management, which are crucial to controlling the costs in green construction.

With a lesser focus but still relevant, McGrath (2018) highlights the economic implications of GB through the widespread adoption of accreditation programs in larger cities and notes the financial incentives offered. Darko et al. (2017) also discuss the disparity in the perception of costs as a barrier in smaller municipalities where financial resources may be less abundant compared to larger cities.

***Public Perceptions and Awareness***

Three articles focused on public perception unpack general understandings and misconceptions about GB benefits and how they play a crucial role in adopting GB practices. Three of the articles in the SLR have focused on the theme. In the Standard issue 001/US Public Research Report. Living Standard (2020), public opinion surveys on environmental issues and GBs revealed a general lack of understanding about the role buildings play in environmental health and sustainability, that only a small percentage of the population views GBs as a viable means to improve environmental conditions. Altomonte et al. (2017) focus on evaluating the impact of GB certification systems, specifically LEED, on occupant satisfaction in office buildings and found that achieving specific LEED credits does not significantly enhance occupant satisfaction. Mansour and Radford (2014) examine the perceptions of building occupants regarding GBs, highlighting a discrepancy between architect's intentions and occupant satisfaction in green vs standard buildings.

***Socio-Environmental Benefits***

Socio-environmental benefits evaluate sustainable practices' broader ecological and social rewards, including reduced energy consumption and lower carbon emission, which are well-documented advantages of GB practices. The Sustainable SITES Initiative and LEED, discussed by Benjamin (2017) about SITES (2023), promote these benefits as central to their certification criteria to encourage the broader adoption across an array of settings; however, in smaller municipalities, the translation of these benefits remains limited. Darko et al. (2017) discuss the environmental and social benefits of adopting GB technologies, such as improved energy and water efficiency, enhanced company image and reputation among consumers and communities. Dalirazar and Sabzi (2020) consider environmental impacts to be a significant factor in socio-environmental benefits when overcoming barriers. Doan et al. (2017) review different rating systems to, in part, assess their socio-environmental benefits and note that while all systems emphasize environmental sustainability, BREEAM considers the social impacts.

***Sustainability and Social Equity***

Sustainability and social equity articles assess how green buildings contribute to fair and inclusive community growth. Golić et al. (2023) identify barriers to socially sustainable practices in residential building projects and emphasize the need for integration of social sustainability in building standards to enhance the social fabric of urban environments. Ahmad et al. (2019) discuss how project management and sustainability work together to achieve better sustainability outcomes without compromising social equity. They show that well-managed projects using sustainable practices do not necessarily lead to higher costs or longer project timelines, making sustainable solutions more accessible. In their systems research, Doan et al. (2017) explore the social aspects of BREEAM and recognize the need for social equity within GB

practices, which is under-emphasized across all other rating systems examined in their research. Olanrewaju et al. (2022) highlight integration challenges and opportunities between Building Information Modeling (BIM) and GB certification systems for enhancing the efficiency and effectiveness of GB projects. They also look at the disparity that favors environmental sustainability over social (and economic) sustainability and advocate for more balanced considerations in GB projects.

### *Cultural and Regional Considerations*

Cultural and regional considerations include unique local attributes influencing GB adoption. Florez (2020) reviews different GB rating systems, discussing their adaptability to regional environmental, social, and cultural needs and how they are tailored to reflect local conditions, which is crucial for their acceptance. Doan et al. (2017) discuss the geographic disparities in adopting and developing GB standards, highlighting the differences in how sustainability is approached regionally. Vierra (2023) mentions the global evolution of standards and the need for them to adapt to different national priorities and contexts.

### *Strategies for Overcoming Barriers*

Strategies for overcoming barriers propose actionable pathways to mitigate the challenges uncovered in the research. The literature offers varying degrees of barrier identification and strategies for overcoming; however, only three articles significantly explore this theme. Dalirazar and Sabzi (2020) conducted their entire research on barriers and strategies by using the PESTLE analysis framework to identify and address the political, economic, social, technological, legal, and environmental barriers to sustainable building. Their analysis suggests solutions like government financial incentives and adopting technologies such as Building

Information Modelling (BIM) to reduce these barriers and promote sustainable building practices. Ahmad et al. (2019) explore how various factors, such as project management, client vision, regional constraints, and innovation, influence the performance outcomes of GB projects, recommending Integrated Project Delivery (IPD), early incorporation of sustainability, comprehensive project planning, client engagement education, effective/rigorous project management, value engineering with a sustainability focus, engaging advanced technologies and innovative practices, and a standardized approach for GB development. Darko et al. (2017) discuss the barriers, drivers, and strategies for GB technology adoption and propose solutions in the form of financial incentives, better information about costs and benefits, and green labeling to promote adoption. Golić et al. (2023) also discuss strategies for overcoming barriers related to sustainability and social equity through better educational programs for stakeholders, improved and more inclusive building policies, and the design of incentive systems to promote social sustainability in addition to environmental and economic factors. Olanrewaju et al. (2022) identify gaps where BIM could further support sustainability in GB certification systems by suggesting technological advancements and integrated approaches to enhance sustainability.

## Discussion

The pilot study and subsequent survey research findings demonstrate that while smaller municipalities know the benefits of GB practices, significant barriers hinder their widespread adoption. These barriers primarily include perceived and actual high costs and a lack of understanding of the practical benefits of GB accreditation. The significant difference between recognition and participation suggests a gap where targeted educational interventions and financial incentives could make a significant difference.

The gap is further defined in the survey results, where financial incentives emerge as one of the top motivators for homeowners considering GB practices. However, the support for GB among local architects and developers was mixed, indicating potential gaps in advocacy or tangible benefits that could be addressed through community engagement and professional development opportunities. There is also a strong consensus on the necessity of public support for promoting sustainable practices, yet barriers such as stakeholder resistance and limited awareness persist.

Moreover, insights from two interviewees with firsthand experience in GB projects revealed insights into operational and systematic challenges in the certification process itself. It was pointed out that the LEED certification often applies only to buildings and not the companies/designers involved in the construction, which may limit a comprehensive adherence to green practices (Interviewee #30, Personal Communication, February 28, 2024). This highlights a critical oversight in the certification process, where the emphasis is on new buildings rather than inclusive strategies to encompass existing structures and renovations common in smaller municipalities. Such limitations suggest a more holistic approach to

certification beyond the physical structure to include the processes and parties involved, enhancing the integrity and impact of GB certification.

Interviewee insights and survey findings align with some of the literature, such as McGrath (2018), who reported the contrast in adoption rates between larger cities and smaller municipalities. The literature further underscores challenges ranging from the perceived high costs of constructing GBs (Hu, 2022) to aligning local building practices with broader, nationally recognized standards, as discussed by Simon and Jackson (2022).

The broader literature on GB accreditation, such as studies by Altomonte et al. (2017) and Dalirazar and Sabzi (2020), supports the idea that perceptual and knowledge-based drivers must be addressed beyond the financial costs. Altomonte et al. found limited awareness of the impact of GB practices on occupant satisfaction, which suggests that public perceptions may not align with the empirical benefits of sustainable building practices. This seems to reflect the broader issue of GB practices not being fully understood or valued at the municipal level, potentially due to inadequate communication of their benefits and the technical requirements involved.

Integrating these insights with the theme of this paper, it becomes evident that for smaller municipalities, the transition to widening the adoption rate of GB practices requires not just policy adjustments but a cultural shift. The success seen in larger cities, noted by McGrath (2018) and further contextualized in the Canadian context by Vandenburg (2021), points towards a model where GB practices are incomplete without addressing the role of the public in supporting these initiatives. The pilot study indicated a general and somewhat passive awareness among participants, indicating active community engagement strategies would be

instrumental in bridging the gap between awareness and action. This would involve drafting policies and incentives that are economically viable and socially and culturally resonant with the local demographics, fostering a community-centric approach to sustainability that aligns with local values.

## Conclusion

This research examines the adoption of GB practices across different urban scales, focusing on smaller municipalities where GB accreditation has lagged behind larger urban centers. Through a mixed-methods approach encompassing a pilot study, survey, in-depth interviews, and SLR, this study has identified significant barriers, including higher perceived costs, limited public awareness, and lack of robust advocacy for GB practices from professionals and municipal officials. These factors collectively contribute to the hesitancy among stakeholders in smaller municipalities to adopt GB standards despite the growing prevalence and success seen in larger cities.

Findings from the pilot study, survey, and interviews indicate that while there is a general recognition of the benefits of sustainable building practices, actual participation remains low due to economic concerns and perceived complexities associated with GB processes. This underscores the critical need for tailored educational initiatives and incentive policies that address smaller municipalities' specific needs and contexts. It also highlights the importance of creating more inclusive and accessible GB accreditation programs catering to a more diverse population, including homeowners, renters, and small business owners.

The literature shows evidence that while GB practices are well-established in larger urban areas, a noticeable gap in their application at the municipal level suggests a need for localized strategies. The research aligns with the broader views on sustainable development, which advocate for more integrated approaches to environmental sustainability and social equity.

The study recommends several actionable steps to enhance the adoption of GB practices in smaller municipalities, including developing comprehensive educational programs, implementing incentivized policies, differentiating accreditation standards to meet diverse needs, and simplifying the certification process to make it more accessible. Further research into how GB practices can contribute to social equity and sustainable urban development is necessary to bridge the gaps.

By bridging the gap in GB accreditation and fostering a more inclusive approach to sustainability, smaller municipalities can enhance their resilience, sustainability, and overall quality of life. This study is a foundation for ongoing efforts to promote sustainable building practices and emphasize the role of tailored, community-specific strategies in achieving broader environmental and social goals.

**Limitations**

This study faced limitations that may impact the interpretation of findings: While efforts were made to select potential participants with a broad range of experiences and education, the reliance on convenience sampling introduces potential biases through lack of randomness. The researcher was, however, to a great extent unaware of participant knowledge of GB practices or sustainability in general.

A significant limitation was the low number of renters in the sample; some expressed feeling that their contributions were somehow less significant due to their rental status. This points to a broader issue of social equity within GB practices, as renters may not feel included or represented in discussions about sustainability and certification. The absence of renter perspectives could affect the reliability of conclusions drawn about barriers to GB adoption.

Seven participants initially agreed to participate in follow-up interviews but withdrew, reducing the depth and variety of qualitative data and limiting a deeper exploration of individual experience and insight.

Three participants also skipped over questions requiring rankings, which suggests possible issues with survey accessibility or device compatibility. Although this was previewed before survey deployment, a lack of explicit written instructions might have been helpful.

**Next Steps and Recommendations**

Given the challenges identified through this research, several steps can be taken to enhance the adoption of GB practices:

Comprehensive Educational Initiatives: These would target the public and professionals to enhance understanding and disseminate misconceptions about GB practices. This would involve clarifying the practical benefits and potential cost savings over time.

Incentivized Policies by Municipal Governments: Local governments should develop policies that include tax breaks, rebates, and a streamlined process for sustainable renovations. Policies should allow homeowners greater autonomy in deciding who performs necessary work, promoting a sense of ownership and involvement in sustainability efforts.

Expansion of GB programs: To include small businesses, individual homeowners, and renters, ensuring that these programs are inclusive and address the diverse needs and constraints of these groups.

Further Studies on Social Equity: To ensure GBs benefit all sectors of society, further studies should explore how GB practices can contribute to social equity, mainly through affordable housing and access to sustainable living options.

Streamlined access to GB Certification: Simplify access to information and the application process. Communicate clear, tangible benefits to motivate individuals and businesses to pursue GB.

By addressing these recommendations, smaller municipalities can bridge the gap in GB adoption seen between larger cities and smaller municipalities. This approach addresses the immediate barriers identified in the research. Also, it sets a foundation for sustained growth and acceptance of GB practices, contributing to broader goals of environmental sustainability and community resilience.

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